



United States Department of the Interior



FISH AND WILDLIFE SERVICE
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January 3, 2022

To: Interested Parties

From: Scott Voss, Supervisory Fish Biologist, Red Bluff Fish and Wildlife Office

Subject: Biweekly report (December 17, 2021 - December 31, 2021)

Please find attached preliminary daily estimates of passage, 90% confidence intervals, and fork length ranges of unmarked juvenile salmonids sampled at Red Bluff Diversion Dam for the period December 17, 2021 through December 31, 2021. Race designation was assigned using length-at-date criteria.

Mean cumulative weekly passage of winter Chinook thru December 31 (week 52) for the last 18 years of passage data is 96.9% with one standard deviation measuring 3.2%.

NOTE: Bi-weekly reports produced after December 16, 2021 incorporate revised passage values. Brood year 2021 winter and spring Chinook passage estimates in Table 1 and Figures 1, 2 have been revised for the period October 16 through November 4, 2021 due to genetic assignments of fish that differed from field assignments based on length-at-date criteria. These revisions affect all bi-weekly reports generated for 2021 winter and spring Chinook between October 16, 2021 and December 16, 2021. Original and revised biweekly reports can be found at: https://www.fws.gov/redbluff/rbdd_biweekly_final.html.

Additionally, bi-weekly reports produced after July 1, 2021 will be revised at a later date due to ongoing trap efficiency model analyses. Due to changes in river channel morphology in recent years at the Red Bluff Diversion Dam sample site along with sampling predominantly smaller 5' rotary traps, trap efficiency estimators and models are being reviewed at this time and passage estimates are subject to change in-season and/or post-season. This report contains passage estimates using a trap efficiency model that includes data from mark-recapture experiments from 2018-2021 and is currently the best available data to report preliminary real-time passage estimates with. Feel free to contact me if there are any questions.

This report also contains graphical displays of salmonid passage dating back to 2014 for comparison.

Please note that data contained in these reports is subject to revision as this data is preliminary and undergoing QA/QC procedures.

If you have any questions, please feel free to contact me at (530) 527-3043 ext 243.

Table 1.— Preliminary estimates of passage by brood-year (BY) and run for unmarked juvenile Chinook salmon and steelhead trout captured by rotary-screw traps at Red Bluff Diversion Dam (RK391), Sacramento River, CA, for the dates listed below. Results include estimated passage, peak river discharge volume, water temperature, turbidity, and fork length (mm) range in parentheses. A dash (-) indicates that sampling was not conducted on that date.

Date	Discharge volume (cfs) ¹	Water temperature (°C)	Water turbidity (NTU)	Estimated passage				
				BY21 Winter	BY21 Spring	BY21 Fall	BY21 Late-Fall	BY21 RBT
12/17/2021	23,827	8.7	90.5	1,527 (60 – 93)	8,177 (38 – 41)	93,852 (29 – 37)	1,737 (104 – 144)	0 (–)
12/18/2021	9,156	8.7	16.2	893 (54 – 88)	3,860 (38 – 49)	45,196 (30 – 37)	425 (102 – 184)	85 (78 – 105)
12/19/2021	6,353	7.6	7.8	530 (52 – 101)	2,866 (38 – 41)	58,135 (31 – 37)	100 (109 – 109)	68 (103 – 118)
12/20/2021	5,577	9.0	6.2	71 (57 – 86)	513 (39 – 50)	18,568 (31 – 38)	73 (105 – 107)	74 (102 – 187)
12/21/2021	5,253	8.7	6.4	148 (69 – 95)	433 (39 – 47)	18,456 (31 – 38)	0 (–)	0 (–)
12/22/2021	5,340	8.6	5.9	0 (–)	242 (39 – 39)	11,293 (32 – 38)	0 (–)	0 (–)
12/23/2021	13,258	8.6	7.6	0 (–)	275 (39 – 39)	2,479 (32 – 36)	0 (–)	0 (–)
12/24/2021	17,508	9.0	56.7	1,172 (71 – 85)	1,697 (39 – 44)	77,515 (28 – 39)	0 (–)	0 (–)
12/25/2021	11,998	8.9	–	–	–	–	–	–
12/26/2021	20,431	7.4	–	–	–	–	–	–
12/27/2021	11,852	7.7	19.6	0 (–)	983 (40 – 48)	34,207 (32 – 39)	0 (–)	0 (–)
12/28/2021	9,513	8.0	10.8	224 (59 – 73)	533 (41 – 47)	25,831 (32 – 40)	369 (111 – 123)	197 (116)
12/29/2021	7,195	7.8	5.6	157 (69 – 82)	275 (41 – 46)	21,164 (30 – 40)	0 (–)	0 (–)
12/30/2021	7,572	7.7	6.8	51 (92)	233 (41 – 45)	14,444 (31 – 40)	44 (130)	0 (–)
12/31/2021	6,741	8.7	7.7	43 (79)	296 (41 – 47)	39,871 (30 – 40)	82 (115 – 118)	0 (–)
Biweekly Total ²				5,365	21,722	532,022	2,995	490
<i>Biweekly Lower 90% Confidence Interval</i>				1,946	11,286	320,375	782	-47
<i>Biweekly Upper 90% Confidence Interval</i>				8,784	32,158	743,669	5,208	1,026
Brood Year Total				569,921	102,454	686,570	58,363	82,077
<i>Brood year Lower 90% Confidence Interval</i>				422,083	60,171	370,103	29,590	48,787
<i>Brood year Upper 90% Confidence Interval</i>				717,759	144,737	1,003,036	87,136	115,367

¹ Peak daily discharge values do not account for diversions at RBDD and only represent peak flows registered at the Bend Bridge Gauging station (<http://cdec2.water.ca.gov/cgi-progs/queryFx?bnd>).

³ Biweekly totals may be greater than the sum of the daily estimates presented in this table if sampling was not conducted on each day of the biweekly period. A dash (-) denotes those dates. To estimate daily passage for days that were not sampled, we impute missed sample days with the weekly mean value of days sampled within the week.

Juvenile Winter Chinook Salmon Estimated Passage

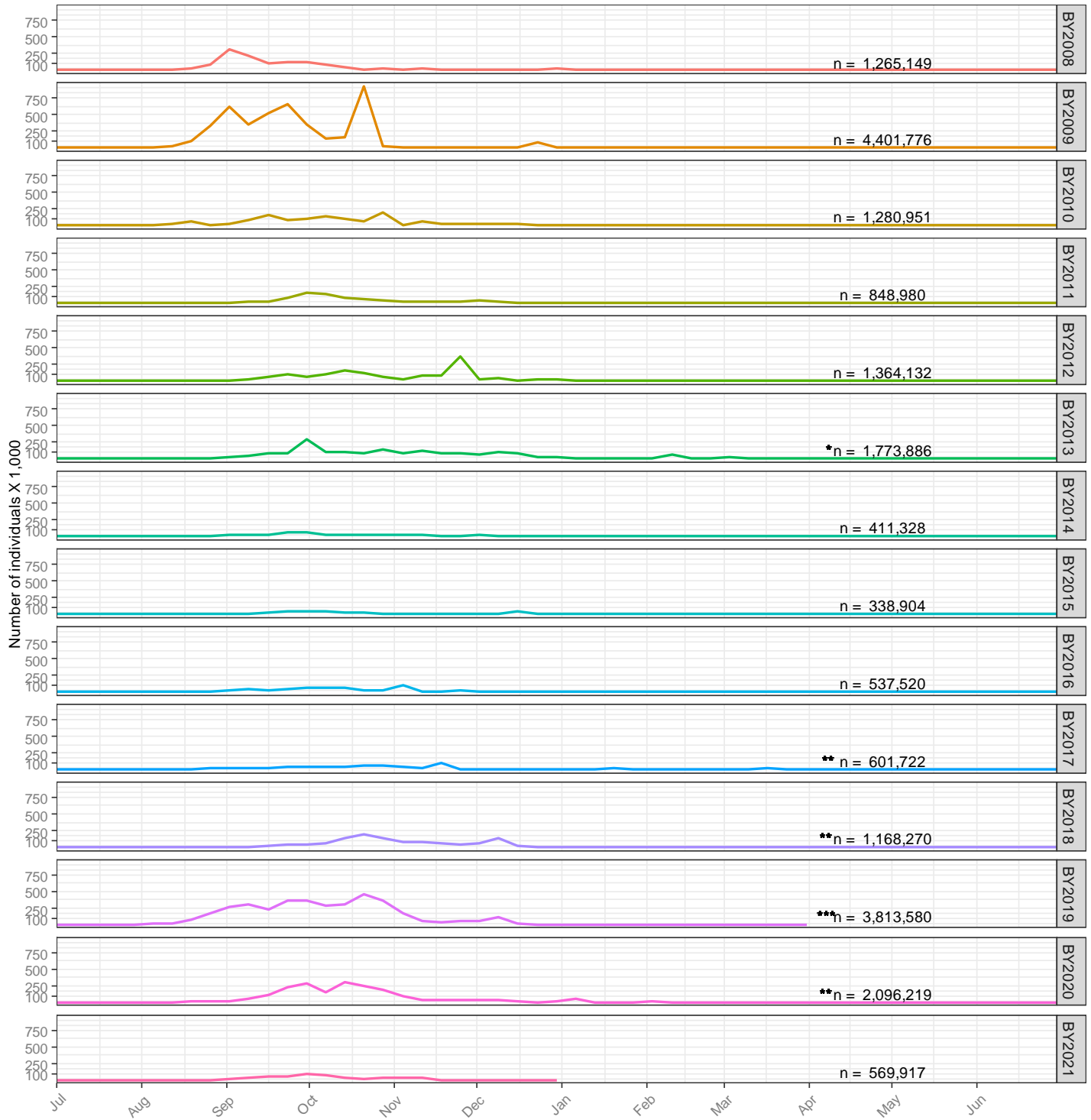


Figure 1. Weekly estimated passage of unmarked juvenile winter Chinook salmon at Red Bluff Diversion Dam (RK391) by brood-year (BY). Fish were sampled using rotary-screw traps for the period July 1, 2008 to present.

*Winter Chinook passage value interpolated using a monthly mean for the period October 1, 2013 - October 17, 2013 due to government shutdown.

**Winter Chinook passage value reflects addition of length-at-date spring Chinook determined to be winter Chinook from genetic analysis during the period Oct 16th thru Nov 18th during brood years 2017 thru 2020. See memos on 2018 & 2019 biweekly report pages for more info.

***Rotary-trapping/juvenile fish monitoring operations at the Red Bluff Diversion Dam were suspended March 25, 2020 to June 30, 2020, to protect employee health and safety resulting from COVID-19 global pandemic.

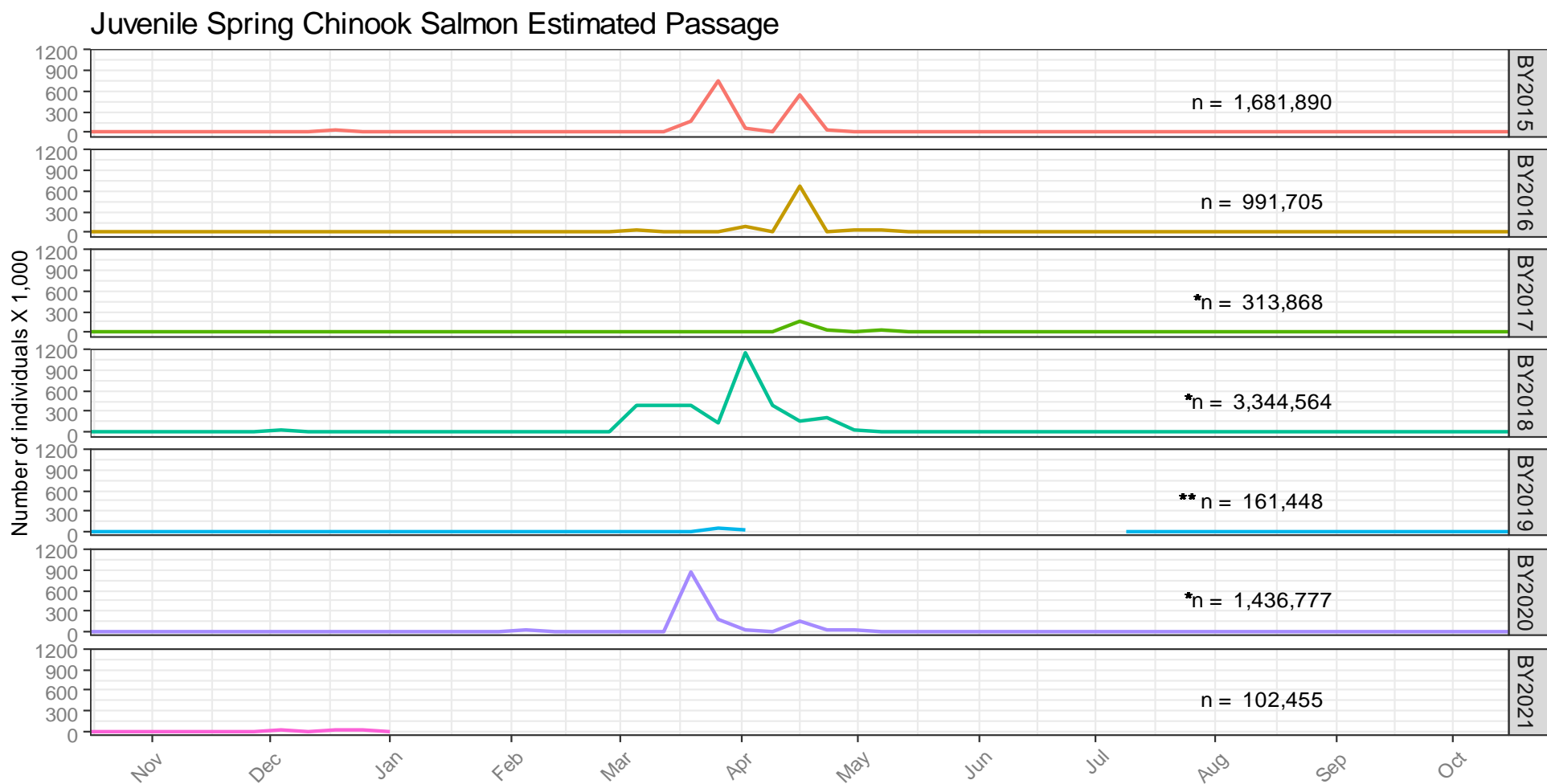


Figure 2. Weekly estimated passage of unmarked juvenile spring Chinook salmon at Red Bluff Diversion Dam (RK391) by brood-year (BY). Fish were sampled using rotary-screw traps for the period October 16, 2015 to present .

*Spring Chinook passage value reflects subtraction of length-at-date spring Chinook determined to be winter Chinook from genetic analysis during the period of October 16th thru November 18th during brood years 2017 thru 2020. See memos on biweekly report website for more info .

**Rotary-trapping/juvenile fish monitoring operations at the Red Bluff Diversion Dam were suspended from March 25, 2020 to June 30, 2020, to protect employee health and safety resulting from the Coronavirus/COVID-19 global pandemic .

Juvenile *Onchorhynchus mykiss* Estimated Passage

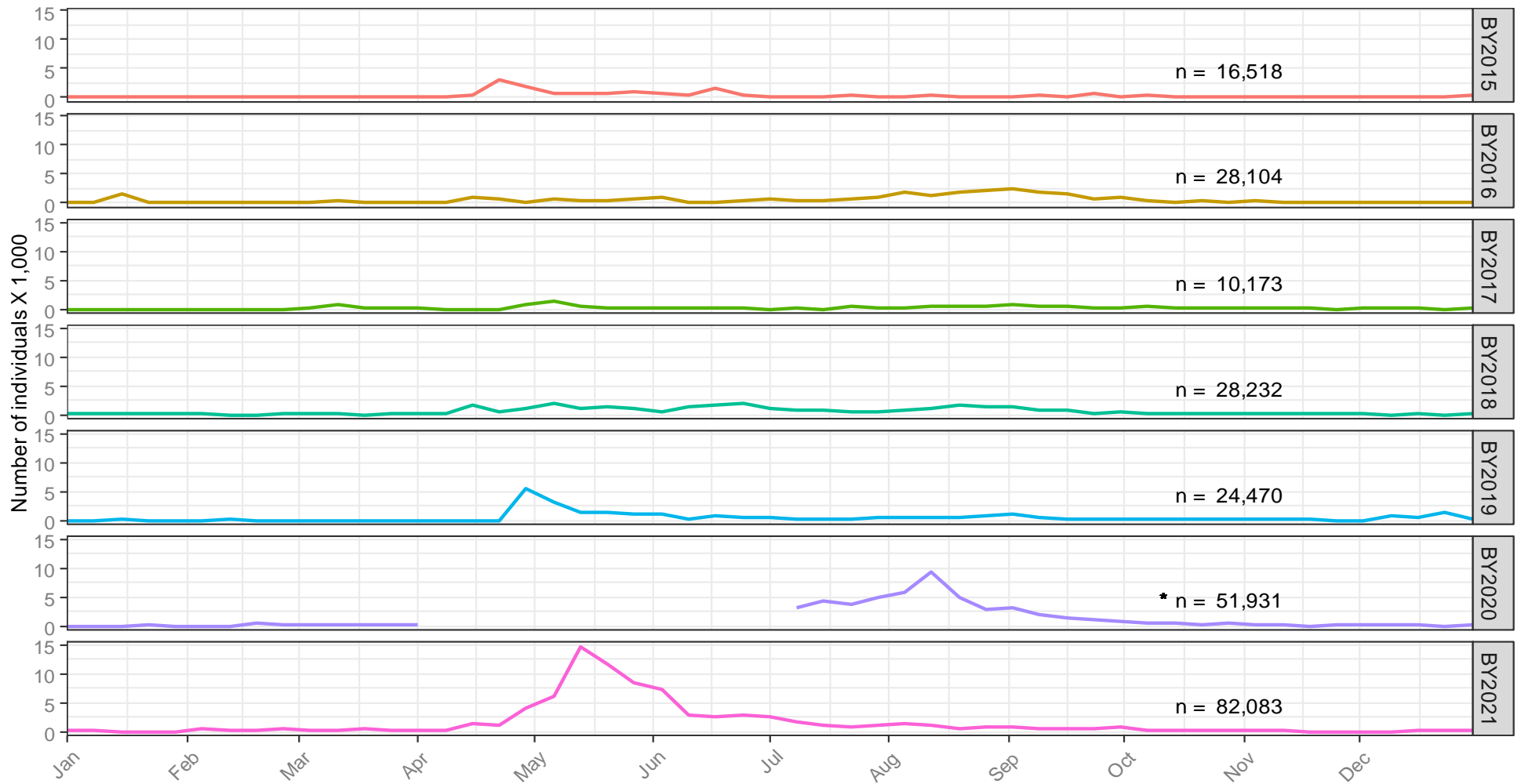


Figure 3. Weekly estimated passage of unmarked juvenile Rainbow/Steelhead trout at Red Bluff Diversion Dam (RK391) by brood-year (BY). Fish were sampled using rotary-screw traps for the period January 1, 2015 to present .

*Rotary-trapping/juvenile fish monitoring operations at the Red Bluff Diversion Dam were suspended from March 25, 2020 to June 30, 2020, to protect employee health and safety resulting from the Coronavirus/COVID-19 global pandemic .

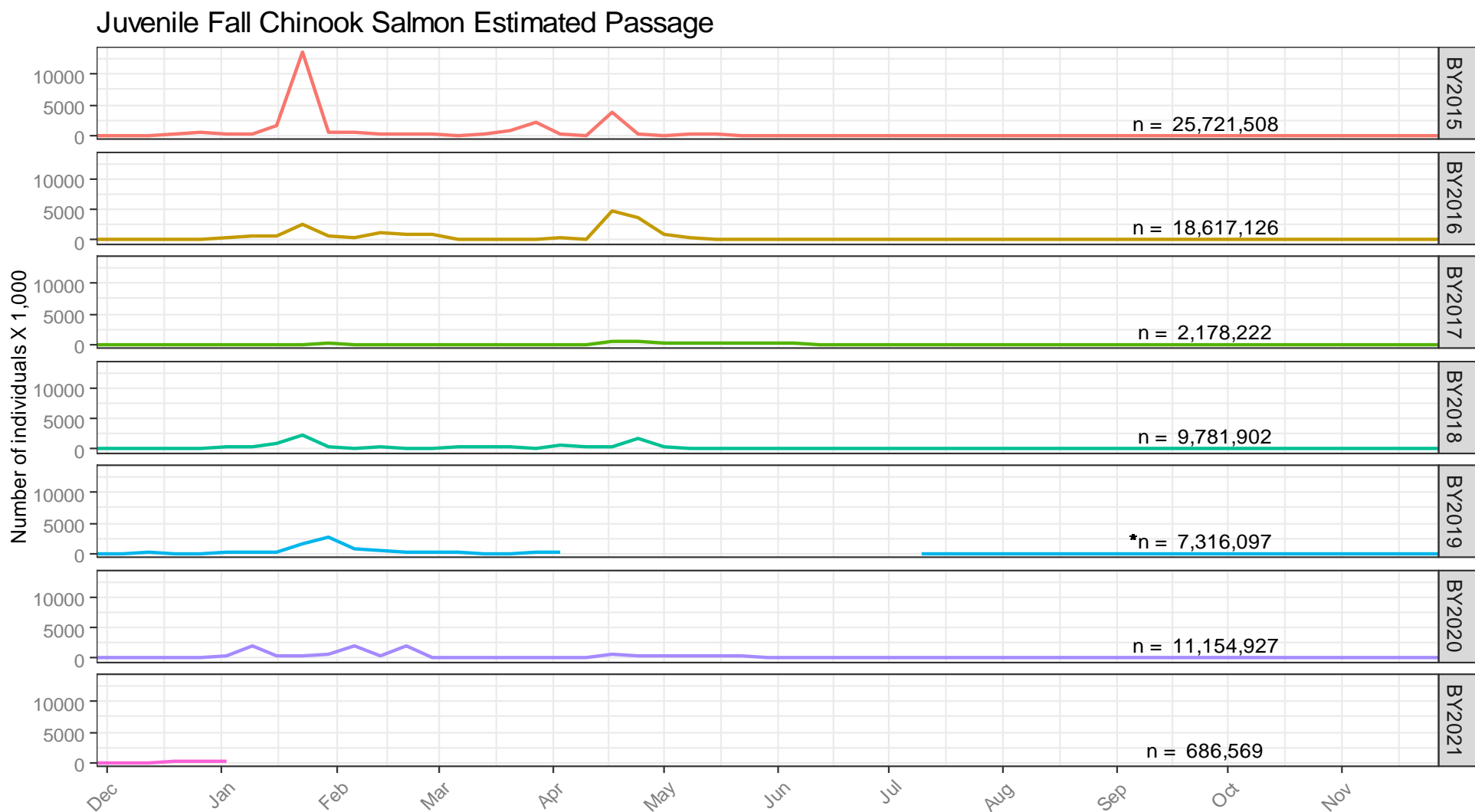


Figure 4. Weekly estimated passage of unmarked juvenile fall Chinook salmon at Red Bluff Diversion Dam (RK391) by brood-year (BY). Fish were sampled using rotary-screw traps for the period December 1, 2015 to present .

*Rotary-trapping/juvenile fish monitoring operations at the Red Bluff Diversion Dam were suspended from March 25, 2020 to June 30, 2020, to protect employee health and safety resulting from the Coronavirus/COVID-19 global pandemic .

Juvenile Late Fall Chinook Salmon Estimated Passage

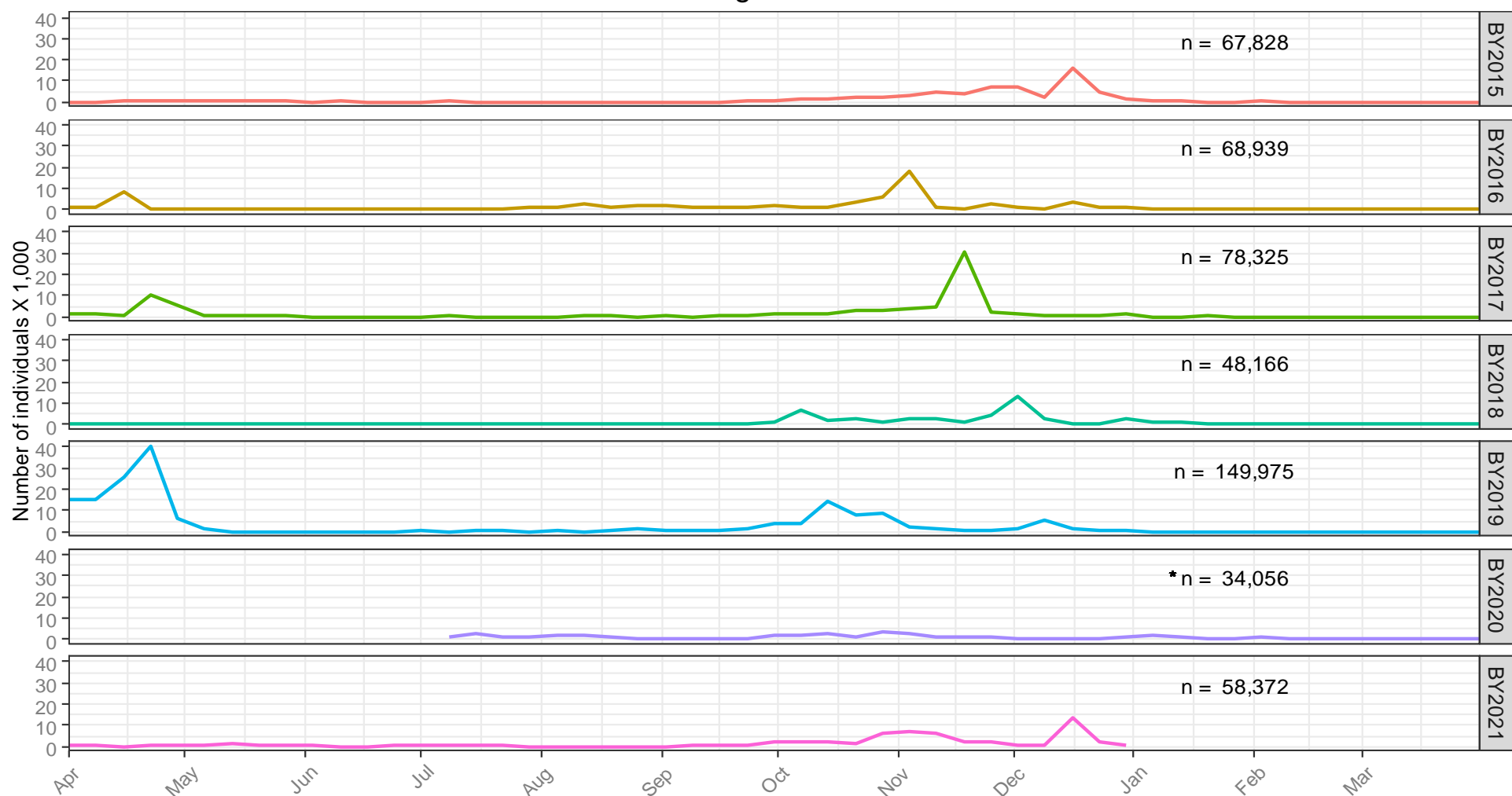


Figure 5. Weekly estimated passage of unmarked juvenile late fall Chinook salmon at Red Bluff Diversion Dam (RK391) by brood-year (BY). Fish were sampled using rotary-screw traps for the period April 1, 2015 to present .

*Rotary-trapping/juvenile fish monitoring operations at the Red Bluff Diversion Dam were suspended from March 25, 2020 to June 30, 2020, to protect employee health and safety resulting from the Coronavirus/COVID-19 global pandemic .

Weekly Estimated Chinook Passage at Red Bluff Diversion Dam - All Runs Combined

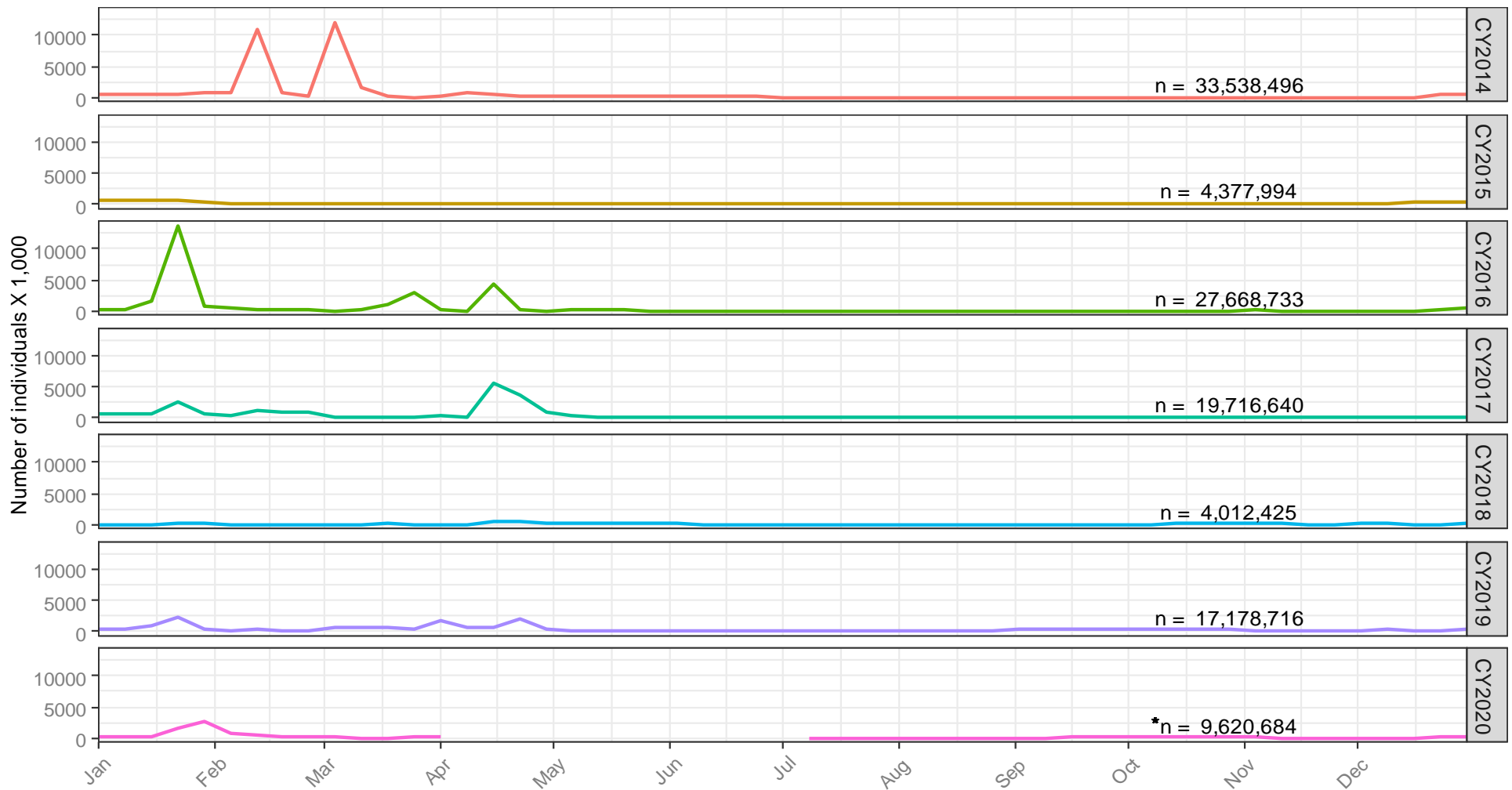


Figure 6. Weekly estimated passage of unmarked juvenile Chinook salmon at Red Bluff Diversion Dam (RK391) by calendar year. Fish were sampled using rotary-screw traps for the period January 1, 2014 to December 31, 2020 .

*Rotary-trapping/juvenile fish monitoring operations at the Red Bluff Diversion Dam were suspended from March 25, 2020 to June 30, 2020, to protect employee health and safety resulting from the Coronavirus/COVID-19 global pandemic .